U. S. Army Corps of Engineers
Air Stripping
Performance Checklist

Installation Name	_____
Site Name / I.D.	_____
Evaluation Team	_____
Site Visit Date	_____

This checklist is designed to facilitate the performance evaluation of an air stripping unit treatment process used to remove volatile contaminants from a water stream. It is divided into the following sections:

1) Evaluation team composition
2) Typical treatment objectives
3) References
4) Data collection requirements
5) Performance analysis calculations
6) Adequacy of operations and maintenance
7) Typical performance problems
8) Alternatives for possible cost savings
9) Supplemental notes and data.

The checklist provides suggestions for information gathering, and space has been provided to record data and notes from the site visit. Supplementary notes, if required, should be numbered to correspond to the appropriate checklist sections.

1) Evaluation Team Composition

The following disciplines should be included in the evaluation team for the air stripping treatment system.

- Process Engineer (site visit, evaluate treatment system)
- Chemist (treatment/analytical chemistry)
- Regulatory Specialist (regulatory requirements)
- Cost Engineer (cost of alternatives)

2) Typical Treatment Objectives

Verify that the treatment objectives established when the air stripping system was designed and installed are clear and still valid.

Air stripping is typically used for the removal of volatile, dissolved contaminants having low solubility, in order to meet regulatory requirements prior to surface discharge or injection into groundwater. Although chlorinated solvents (e.g., TCE, PCE) and BTEX compounds are efficiently removed by air stripping, contaminants with lower volatility (e.g., PAH), or with high water solubility (e.g., acetone, MEK) are not.

The operational and maintenance costs of an air stripping system (and the associated off-gas treatment, if required) can require a significant financial commitment over a long term. Therefore efforts should be made to implement actions that will reduce the operations, maintenance, and monitoring costs for the treatment system.

3) References

Coordinate this checklist with the Vapor/Off-gas Blower and Piping; Liquid Process Piping; Process Instrumentation and Control; and the applicable air stripper emission air pollution control device checklists. Also review the operations and maintenance manuals specific to the air stripping treatment operation.

4) Data Collection Requirements

a) Record the following information needed for performance calculations, and to check the operation of the air stripper. Record the appropriate units with each value.

Stripper type (low profile or column) _____

Column diameter or tray dimensions _____

Packing type and height _____

Water flow rate and temperature _____

Air flow rate and temperature _____

Water Chemistry:			
Calcium		Hardness	
Iron (+2)		Manganese	
Total Suspended Solids		Total Solids	
pH		Alkalinity	
(Other)		(Other)	

Stripping Requirements:		
Volatile Contaminant	**Influent Conc.**	**Required Effluent Conc.**

b) Verify that the liquid distributor at the top of a packed column air stripper is level and uniformly distributing the influent water over entire cross section of the packing. Verify that the mist eliminator is functioning correctly. (Some low profile air strippers do not have mist eliminators.)

_____

_____

c) Is the air stripper properly supported? Note condition of the foundation bolts and piping. Look for other areas of stress.

_____

_____

d) Record the nameplate information from the air stripper, blower, pumps, and other mechanical equipment for future reference.

_____

_____

_____

_____

e) Sketch the process flow diagram (PFD), including valves and instrument locations, on the back of this sheet or on a separate sheet.

5) Performance Analysis Calculations

a) Are the liquid and vapor flow rates the same as those in the design specifications? Perform air stripper design calculations and check the manufacturers design information to see if the air rate can be reduced and still meet the desired treatment requirements. The air rate can often be reduced if the water flow rate has decreased.

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6) Adequacy of Operations and Maintenance

a) Verify that the ancillary equipment (pumps, blowers) are maintained per manufacturers recommendations. (See vapor/off-gas blower and piping and liquid process piping checklists.) Check the ancillary equipment maintenance records (pumps/blowers).

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_____
_____

b) Determine if the air stripper is producing excessive noise in nearby residential or office areas. Have there been any complaints?

_____
_____

c) Verify that high/low sump control and blower malfunction visible/audible alarms are working. Are there provisions to notify an operator of malfunctions when the unit is unattended?

_____
_____
_____

d) Inspect the air stripper system for corrosion.

_____
_____
_____

e) Verify that the effluent is being sampled and analyzed in accordance with the sampling and analysis plan designed to verify the air stripper is operating correctly. Determine if any additional monitoring is needed to properly evaluate the operating conditions. If samples are not needed for regulatory compliance, can simple field methods work?

_____
_____
_____

f) What is the air stripper cleaning frequency? Verify that the unit is monitored for fouling from scaling (iron, calcium, manganese) or biological fouling (increased pressure drop, periodic visual inspection of packing or trays). Verify there is a differential pressure gauge (or other means) to monitor for plugging as a result of scaling or biological fouling. Is the pressure drop across the packing approximately the same as the pressure drop calculated from the packing manufacturer? If not, determine why. If fouling can occur review the procedures for removal to determine whether they are adequate. Are there other processes that would be better? If acid is used to remove the fouling, verify that the procedures for safely handling and correctly disposing of the acid are adequate.

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7) Typical Performance Problems

a) If the air stripper is located outside, are there provisions to drain the water lines and the sump when the unit is shut down? Inspect the air stripper system for proper insulation to prevent rupture of lines due to formation of ice during operation.

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b) Some materials of construction, (e.g., plastics, fiberglass) are subject to degradation from ultraviolet light. Is there a potential for UV degradation ?

_____
_____

8) Alternatives for Possible Cost Savings.

The contaminant compounds in the water stream and/or the contaminant concentrations may have changed to the extent that other treatment alternatives are more cost effective. Consider the following:

a) Determine if the air stripper operation is still necessary, or whether the influent concentrations decreased so that the operation can be terminated. Can the unit be easily bypassed if this treatment is no longer needed?

_____
_____
_____

b) Are more cost effective treatment alternatives available which will meet the present treatment requirements?

_____
_____
_____

c) Compare the air emissions to the design levels to determine if the off gas treatment (carbon, thermal oxidation, etc.) can be reduced or discontinued.

_____
_____
_____

9) Supplemental Notes and Data

There are _____ pages of supplemental notes and data attached to this checklist.